

# BEST AVAILABLE COPY

Title:

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Sewing machine having a wireless switch and independent controller.

Back ground of the invention.

## 1. Field of invention.

The present invention relates to a sewing machine and more particularly to a sewing machine having a wireless switch and a independent operating speed controller attached to the machine body of the sewing machine.

There are safety instances when a sewing machine needs to be operated by remote control where for example the remote control eliminates the cable between a transmission switch and the machine body. A sewing machine with the above mentioned switch can also be used where a person has restricted movement. The transmitter switch may be hand held, placed on the floor, attached to the arm, or wrist, enabling the operator too guide the material when transmitting. The wireless switch is portable.

The independent controller which is attached to the machine body can limit the operating speed of the machine. This may be done manually. This can also prevent industrial operators sewing too fast and reducing the quality of the seams. It can also be used whenever several sewing machines work simultaneously, and one single operator can use the remote wireless on/off switch by first selecting the operating motor speed on the machine body and then activating the wireless switch to start the sewing machine.

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## 2. Description of related art.

US Patent No.4 976 552. Describes a remote control sewing machine, where the connection between the transmitter and the receiver is ensured by an optical signal. In the technical solution described, the analogue signal picked up from a variable resistor, which corresponds to the sewing machine foot controller is applied to an analogue digital converter, and the numerical signal obtained is modulated by a conveyor which connects to an optical transmitter. The receiver obtains, after demodulation, a signal with variable amplitude, which controls the sewing machine motor, in this way, by activating the variable resistor of the remote control the motor rotation speed is activated as well. The solution described above is complicated as it needs a numerical analogue converter in the command unit, and because it uses light to transmit information, and poses difficulties for the simultaneous operation of several machines, and therefore this solution has a limited application.

Japanese reference JP 59 050 792 tries to overcome this shortcoming and uses radio frequency, in this case, the command signal obtained on a variable resistor (which corresponds to the sewing machine foot controller) modulates in impulses a radio frequency conveyor with a rectangular signal whose frequency is dependent on the position of the foot controller; after demodulation, the receiver obtains a rectangular signal which, after having been amplified, is applied to a tiltable non-stable circuit. The rectangular signal which has a variable frequency, is applied to a lower filter, which converts the variable signal of the frequency into a variable tension signal. This signal controls an optic connector, and once

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processed, the obtained signal controls the rotation of the motor. The solution described above allows the operation of several sewing machines by a single remote control but it is sensitive to interference radiation which is generated by the sewing machine motors.

US Patent No. 5,247,449 tries to overcome this shortcoming and uses radio frequency. In this case, the command signal is picked up from a variable resistor (which corresponds to the sewing machine foot controller). An analogue digital converter is applied, and then after the frequency modulation (FM) of a radio-frequency signal, the signal is emitted; at reception, after demodulation, in a control block, the signal undergoes a reverse digital analogue conversion and the variable signal controls the motor rotation. A replacement battery is used, the machine will stop operating when the battery has reached a certain level of power to indicate to the operator that the battery needs to be replaced otherwise the machine will malfunction by running continually and cannot be stopped and the speed cannot be changed because the signal cannot be transmitted. As it uses a radio frequency signal as a conveyor, this technical solution allows the operation of several sewing machines by a single remote control, but it remains complicated: it needs coding and decoding of the information to the signal modulation and demodulation, moreover, even if the frequency modulation (FM) is used to transmit the command signal, it is possible that various radio frequency signals—and here we have the interference signals generated by the sewing machine motor—will overlap